PRINTING

ITS

DAWN, DAY, & DESTINY

BY

HENRY BRADBURY.

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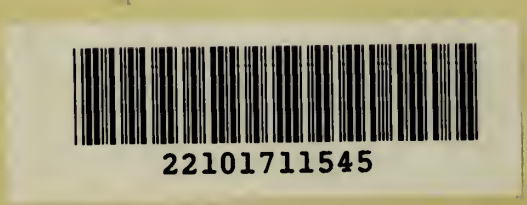

PRINTING:

ITS

DAWN, DAY, & DESTINY.

AN ADDRESS DELIVERED AT THE ROYAL INSTITUTION OF GREAT BRITAIN, ALBEMARLE STREET, ON FRIDAY EVENING, MAY 14, 1858.

THE REV. JOHN BARLOW, M.A. F.R.S. V.P.R.I. IN THE CHAIR.

PRINTING:

ITS

DAWN, DAY, & DESTINY.

Non mirer eſſe quemquam, qui ſibi perſuadeat, corpora quædam ſolida et individua vi et gravitate ferri, mundumque effici ornatiſſimum et pulcherrimum ex eorum concurſione fortuita? Hoc qui exiſtumat fieri potuiſſe, non intelligo cur non idem putet, ſi innumerabiles unius et viginti formæ literarum, vel aureæ vel quales libet, aliquò conjiciantur, poſſe ex his in terram excuſſis ANNALES ENNII, ut deinceps legi poſſint, effici: quod neſcio anne in uno quidem verſu poſſit tantum valere Fortuna.—DE NATURÂ DEOR. *Lib. II. Cap.* 37.

LONDON:
BRADBURY & EVANS, WHITEFRIARS.
1858.

YHD (2)

BRADBURY AND EVANS,
PRINTERS EXTRAORDINARY TO THE QUEEN,
WHITEFRIARS.

TO

HIS ROYAL HIGHNESS

THE PRINCE OF WALES,

THIS ATTEMPT TO ILLUSTRATE, FROM A NEW POINT OF VIEW,

THE POWER AND THE SPREAD OF PRINTING,

AS AN INTELLECTUAL AGENT IN THE DESTINIES OF MAN,

IS MOST RESPECTFULLY

AND OBEDIENTLY

DEDICATED, BY

HENRY BRADBURY.

WHITEFRIARS,
1858.

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Diſcourſe was deemed Man's nobleſt attribute,
And written words the glory of his hand ;
Then followed Printing with enlarged command
For thought—dominion vaſt and abſolute
For ſpreading truth, and making love expand.

WORDSWORTH.

THE ſight of an old book is pleaſing both to ſage and ſimple, and yet, in accordance with the adage, that "a great book is a great evil"—a new book is far more profitable ; but the mode of producing this book, whether new or old, is a matter almoſt neceſſarily unknown, and it is this which I ſhall endeavour to convey to you in elucidating my preſent ſubject—Printing.

As an *idea*, Printing is loſt in the remoteſt ages of antiquity. The moment man had a hiſtory, his firſt endeavour muſt have been to preſerve and tranſmit a memory of his actions, and ſuch being the caſe, we find that all nations with any civiliſation, and even ſavage, had their ſeveral and peculiar means for this purpoſe. The Chineſe had their wood-blocks ; the Aſſyrians their cylinders and bricks, inſcribed or ſculptured ; the Egyptians their hieroglyphs, ſacred and ſealed, and demotic for the people ; the Scandinavians, their runes ; the Mexicans, their picture-writing. The Romans had ſtamped impreſſions on the aſſayed cubes of their metals, while the Etruſcan and other early nations practiſed ſimilar means of inſcription. A king of Greece wrote reverſely upon his hand the word ſignifying "Victory," and impreſſed it on the liver of the victim, to inſpire his ſoldiers with a favourable omen. A diſtinguiſhed philoſopher, and firſt of orators, illuſtrated his argument againſt the chance creation of the world by the impoſſibility of letters fortuitouſly arranging themſelves ſo as to produce a page. The combination of this idea and device would have conſtituted printing.

A curious feature in the hiſtory of inventions is, that they have often trembled on the verge of diſcovery; and it would ſeem that many of theſe ancient means were not only antecedents, but firſt dawns of printing; for we find in yet later ages of antiquity, or, more properly ſpeaking, in later periods of national antiquity, that theſe firſt efforts of printing acquired more decided developments. You have ſeen the Aſſyrian entablatures in the Britiſh Muſeum. The wild ſhepherd with his wandering flock ſaw with amazement his reſuſcitated empire riſe from the tomb of ages at the command of European intelligence and ſkill. Fancy to yourſelves the long halls of the Aſſyrian kings, adorned thus with the hiſtories of their anceſtors, when all thoſe cuneiform characters were filled in with glittering metal, ſo that he who walked might read; and perceive a double truth in Shakeſpeare's words, that there are "ſermons in ſtones." But this was not merely the boaſt of barbaric ſtate. The records of the Chaldean ſeers, their aſtronomical calculations, their title-deeds, their legal writings, were printed on cylinders of clay, and inſcriptions have been found ſo minute, as to require the uſe of a magnifying glaſs to decypher them. Nay more, theſe tablets of baked clay was their monetary medium. After a ſilence of 3000 years, theſe characters ſpeak again; not merely by the ſkill of the interpreter, but by the power of the type-founder. And with this phaſe of books, the Engliſh names of Layard and of Rawlinſon are imperiſhably connected. But the value of theſe ſtone books is double and reflected, and ſhows that the people who uſed them had not merely their own requirements in view, but looked forward, as it were, to their influence on poſterity; for the decyphering of the Egyptian hieroglyphs—another phaſe of literature—depends upon the diſcovery of the Roſetta ſtone, which tranſlated thoſe characters into the world-known language of the Greeks.

As the mode of cutting ſentences and legends in the reverſed order neceſſary for communicating them to other ſubſtances was thus underſtood and practiſed, it ſeems but another ſtep in the progreſs of diſcovery to deviſe a method of engraving and arranging words, ſo that, by the application of a ſuitable pigment, theſe words might be impreſſed upon paper, or any ſimilar ſubſtance, and copies multiplied (for it is this multiplication that is the eſſence of printing) at pleaſure. Diſcoveries, like theſe, however, have in a very remarkable manner ſhown that theſe early means, abortive as

they were, had an everlaſting value. Hiſtories, deeds, almanacs, and even ſpelling-books, have been found in the ruins of the palace of Sennacherib; and while the papyrus and parchment volumes of the vaſt libraries of Byzantium and Alexandria have almoſt, if not entirely diſappeared, the granite pages of Egypt, and the clay leaves of Aſſyria, have eſcaped the ravages of time for the confirmation of truth. But though the art thus trembling into exiſtence, prematurely periſhed, its cognate power, writing, flouriſhed; and in different countries, and in their different characters, continued to enſhrine and communicate the impulſes and the maſter-pieces of thought.

From the heroic to the middle ages there is a blank that we can hardly ſolve, and which in the contemplation of the ſubject it is unneceſſary to conſider. Hiſtory became mythology—learning fable—and the ſole repoſitories of ancient learning were found in the abodes of monks. In theſe times alſo there was no diffuſion of knowledge. There were indeed written books—but no popular literature. The learning which exiſted was the privilege of the monks; the books were in the libraries of the nobles. One remarkable character of theſe books was their exquiſite ornamentation. This was carried to the higheſt pitch by the artiſtic deſigns and brilliantly elaborated colours of the illuminator. From the Roman writing with a ſtylus upon a tablet of wax; from the Egyptian uſe of the papyrus, to this beautifully printed writing, there was a great diſtance and a correſponding advance;—the art was a profeſſion; and the monk manuſcript writer ſat with his implements in his ſecluded room, the *Scriptorium*, the type of the modern printer. Theſe beautiful manuſcripts, gems of art, and priceleſs ornaments of library and muſeum, were not, like the inſpirations of the painter, the reſult of an harmonious whole—they were (like the carving of a ſet of Indian cheſs-men) the painfully elaborated work of a lifetime. There were peculiar inſtruments uſed in their production; there was a ſchool for ſtudents in the art; and in fact, the working ſecret of their labour muſt have partaken, more or leſs, of the character of the modern ſign-painter, when he paints written characters on a board. They had the advantage over their deſcendants, the printers, in beauty of deſign, durability of print, and perhaps in a certain immunity from immediate error. Yet, ſubſequently, theſe valuable manuſcripts, from ſcarcity of material, became

defaced by worſe than barbarian ignorance, for worthleſs treatiſes, and under the name of palimpſeſts, have been again, like their predeceſſors in ſtone, decyphered and reſtored. But, and utterly apart from the prime power of printing as we now enjoy it, in the illimitable multiplication of the ſame work, the printer enjoys advantages which are peculiarly his own. By the variability of his materials he can change the form of the work; admit inſertions, cloſe up deletions; and, to complete the printer's triumph, by the diviſion of the manuſcript, a work might be ſaid to have hardly commenced until it was concluded. Even at this period there were certain characteriſtics amongſt the written books of various countries, provinces, and monaſteries, in contraſt to thoſe exiſting in the large cities, or corporations; and it is to this difference of writing, or rather, as we ſhould deſcribe it, caligraphy, that we may aſcribe the ſtyles and differences of the earlier types. In fact, this was much the ſame, as if our modern authors were to have types caſt for their reſpective works, according to their ſeveral ſcript characters. The endeavour to imitate theſe manuſcripts led to the diſcovery of printing. Letters-patent of the rocks, ſtone-books, clay-books, the Egyptian reed, bark, parchment, paper; theſe ſhow the conſtant deſire of man to be immortal; and "point the moral," that human means walk ſide by ſide with human neceſſities. But the moſt extraordinary fact, and ſtrongly exemplifying that trifles lie at the bottom of truth, in the hiſtory of printing is this: that while rocks were hiſtoric, and tablets perſonal, rags and lampblack are ubiquitous and univerſal.

Printing, not merely the impreſſment of particular characters, but the realiſation of Cicero's notion—that is, printing with moveable types—owes its origin, about the middle of the fifteenth century, to the united labours of three great names: Gutenberg, Fauſt, and Schoeffer: Mentz, in Germany, has the honour of its birth; Gutenberg, the lapidary, was its diſcoverer. Before the time, however, of Gutenberg, and in connection with an important branch of printing (in fact the very mother of the art we now poſſeſs), wood-engraving, picture-blocks of Scriptural ſubjects, with explanatory ſentences, had been in circulation; and theſe might have ſuggeſted—in fact, we have authority that they did ſuggeſt—the idea to Gutenberg of cutting in a reverſed order, and in relief, words, ſentences, or whole pages of manuſcript upon wooden blocks.

Theſe block-books were, in fact, ſomewhat like the ivory diptychs of the Conſuls and the Church, depicting ſome hiſtory or legend, with a few words commemorative of the fact. Three things are remarkable concerning the infancy of the art: the ſecrecy at firſt adopted, which ſerved but for its perfection at the hands of its diſcoverers; the lawſuits which attended the ſeveral partnerſhips, which, by communicating the diſcovery, ſerved to diffuſe it when perfected; and laſtly, the rapidity with which it ſpread over the world. Hence the rival claims of other cities to the honour of the invention; for it *was* the higheſt of honours, by one ſimple thought laboriouſly wrought out by ſimple means, to have advanced the intellect, the induſtry, and the deſtinies of the world.

A religious movement was at the beginning of theſe block-books; this is evident from the titles—the Art of Dying, the Apocalypſe, the Song of Songs, the Bible of the Poor. The very firſt principles of religious faith and inſtruction was their baſis. And, in fact, as they were both novel and ſuggeſtive, we can eaſily conceive, that they were very good ſubſtitutes of their time for preaching. Our own pious Latimer took as text of a ſermon at St. Paul's Croſs, a ſtill earlier example of the practice of wood-engraving, in a pack of cards. It is intereſting to trace, at once, the difference of religious feeling—the advance and the contraſts of art—in theſe earlieſt engravings. Some of the ſubjects are ſimple, and ſome of them ſublime; ſome of them are rude, and others idealiſtic. We have the fall of Man, and the fall of Lucifer; and while in theſe, the deſign is of the coarſeſt, in the illuſtration of the Song of Solomon we have artiſtic and poetic developments of the text. Some of them poſſeſs all the delicacy of the tracery of the old illuminators; in fact, on compariſon, they would appear to have been executed by them; in others the ſections of the ſepulchral braſſes of the period in their ſeveral compartments form the framework for groups of Scriptural ſubjects; while the text is inſerted, either in ſolid lines, or verſes in graceful ſcrolls. But this, however intereſting to the archæologiſt, would be but little in place, if it were not for this—that from it Typography aroſe—while Typography has repaid the benefit, by conſtantly adopting in her ſervice, as her chiefeſt ornament, the art of wood-engraving.

Apart from the labour of the operation, two difficulties here aroſe:—the great

expenſe attending it, and the uſeleſſneſs of the blocks for any other purpoſe. It was here Fauſt, the goldſmith, came forward with his capital and his aid. The art, however, was ſtill imperfect; the wooden types would not regiſter, or remain uniform, thus deſtroying the beauty of the impreſſion, and almoſt rendering the improvement nugatory; Schoeffer then crowned the whole by the fabrication of the punch and matrix, which produced that wondrous power, a printing type. Strange, however, that thoſe ancient wooden types ſtill hold their ground: the poſters in the ſtreets are printed from them. Strange, too, that while theſe types ſtill keep their name, the Canon, the Auguſtin, and the Pica, the movement of time and human ſkill has given us thoſe beautiful forms of type, the Minion, the Diamond, and the Pearl.

Firſt diſcoveries have always loomed into the land of legend: it may fairly be aſſumed, that half the magic in the world was the reſult of iſolated diſcovery before the popular mind was prepared to receive it: and one of theſe worthies, Fauſt, became aſſociated in the popular mind with the character of ſorcerer. On his arrival in Paris, in the reign of Louis XI., the rapidity of the production of theſe fabricated manuſcripts, with the rubrical ornaments, ſuſpected to be blood, gave riſe to the ſtory of the Devil and Doctor Fauſtus. But the more humble workmen, on their diſperſion, took refuge in the monaſteries, and here in peace purſued their labours; leaving, in many caſes, not merely ſpecimens of their art, but their types, (of which a conſiderable quantity muſt have been even then produced,) and their preſſes behind them. The art, which thus aroſe in Germany from the unaided efforts of individuals, in France was foſtered by royal and collegiate patronage. Louis eſtabliſhed a library in the Louvre, and the famous college of the Sorbonne honoured its precincts by harbouring the preſs. But ſtill Germany was maſter of the poſition, and Gering, a German, was the firſt printer in Paris. He exerciſed the art for forty years, and was looked upon almoſt as an aſſociate of the Sorbonne: but this alliance, whatever original benefits it conferred, had an evil effect on the free ſpirit of literature, for it eſtabliſhed that cenſorſhip of the preſs which is continued to our days in the Index Expurgatorius.

The neceſſity, perhaps, which compelled Gutenberg, Fauſt and Schoeffer to co-operate, compelled them alſo to ſeparate. Their myſtery, preſerved in the hopes of amaſſing wealth, and which led them, in ſome inſtances, to the deſtruction of their

work, had too many eyes upon it to remain inviolate; their expenſes were enormous, without immediate return; and the ſtock which they had accumulated was difficult to diſpoſe of, conſiſtent with the prudence it was neceſſary to obſerve. In 1458 this partnerſhip was diſſolved, and then the time arrived when that which had been planned in privacy, publicity had to perfect. This ſoon took place: for in 1462 the ſtorming of Mentz diſperſed the workmen, and gave the ſecret to the world. In 1465 it appeared in Italy, in 1469 in France, in 1474 Caxton brought it to England, and in 1477 it was introduced into Spain. It ſpread indeed with ſuch rapidity, that at the cloſe of the 15th century upwards of two hundred preſſes were eſtabliſhed in Europe.

Books of religion, law, philoſophy, and chivalry were in moſt countries the firſt-fruits of the preſs. The production of books, however, was in Germany comparatively ſlow, and in accordance with the contracted ſtate of education in that country. In France the progreſs was more favourable; but in Italy, the land of the Church, which had within her pale all the learning Chriſtendom could boaſt in thoſe ages, the reſults of the art ſprang to readier and earlier maturity. And this was partly owing to the perfection of its alphabet. Italy had its own character, of different degrees of beauty, at utter variance with the barbarous characters of the nations of the North; and in Paris ſoon aroſe the conteſt between the ſemi-gothic character of Germany and the Roman character, formed in imitation of the characters of the Auguſtan age, to which we are now accuſtomed. It was the conteſt between bigoted monkiſhneſs, the ſuperſeded illuminator, and modern improvement, and it appears to have been compromiſed by a diviſion of the reſpective characters between two ſeparate ſtyles of works —the ſolemn and the ponderous held to the ancient ſemi-gothic; works of literature and the claſſics adopted the Roman.

The early printers, bound down by cuſtom, and the better to cover their deceit, did not conſider their impreſſions as ready for ſale till the initials and other ornaments had been ſupplied by the hands of the illuminator; but the eagerneſs of purchaſers to procure copies, or, perhaps, a deſire to ſave additional expenſe, ſoon occaſioned an indifference to theſe adventitious ornaments. They then, on the principle that pictures are dumb inſtructors, ornamented their books with woodcuts, and theſe, according to time and place, were either of a beautiful or inferior order; great artiſts were ſometimes

employed, and their works are ſtill held in the higheſt eſteem. In the examination of theſe woodcuts, it is intereſting to diſcover the originals in the eye of the deſigner—the mural monument of the old cathedral—or the braſs effigies of ſome noble knight or dame. It is intereſting alſo to obſerve in ancient books the pictured compartments of the page, and the Scripture legends explaining them. The illuminated letter being diſpenſed with, the printers ſubſtituted their woodcut letter, at firſt painting it, and with a brilliancy ſubſequently unattempted. Succeeding artiſts indulged in whimſical and monſtrous deſigns: borrowing from architectural ornaments, waterſpouts, and entablatures of convents and public buildings. Another ſpecies of capital initial conſiſted in grouping together a number of figures, whether human or animal, in the ſhape of a particular letter. Another ſtyle was that of introducing heraldic embelliſhments. Title-pages, at firſt unknown, now came into uſe. The letters were deeply cut into a large wood-block, leaving the ſurface as a dark back-ground, to give greater effect. Figures were ſubſequently introduced—hiſtorical portraits, and knights on horſeback. The moſt favoured faſhion of title-pages then became that of engraved borders with fanciful deſigns, birds, fruit, flowers, vaſes, in the centre of which the name of the work and that of the author was inſcribed. The laſt mode of ornamental printing was the introduction of the monogram of the printer, either at the beginning or end of the book, which was ſuppoſed to confer a claſſical appearance on the work ſolely as that of its printer.

In the hiſtory of printing, it is to be obſerved, that its very defect at firſt, became ſubſequently a neceſſity. Embarraſſed by the accumulation of their wood-blocks, the firſt printers were driven to the invention of the moveable type; but when the ſecret of printing, as the mere producer of manuſcripts, was divulged—and when its value was appreciated, and a comparatively large iſſue of the ſame work was demanded; then, a return, if poſſible, in ſome ſhape to their original proceſs, would have been uſeful: for its conſtant reproduction would have been certain, without the trouble and expenſe of recompoſition. This gave riſe to experiments for another modification of type, of great value, and without which the operation of printing, as abſolutely neceſſary to meet the requirements of literature at the preſent day, as alſo

the great diurnal neceſſities of the Preſs, would have been utterly nugatory. Many attempts of different kinds, and of various degrees of efficiency, have from time to time, through the ſubſequent hiſtory of the art of printing, been made to accompliſh this—and in our times they have ſatisfactorily terminated in the invention, not merely of fixing, but of perpetuating the type, by a means ſubſequently to be explained to you as the ſtereotype.

The works of the early printers were almoſt invariably of the ſame character; it was only when printing had reached claſſic countries, and acquired a general diffuſion, that it was applied to claſſic works. Connected with monaſteries, it did monaſtic work; and in England alſo, its firſt ſpecimens were confined to the legends and ſtatutes and the earlier treatiſes on law:—then the chronicles or firſt gatherings of philoſophic hiſtory. Arrived at the day, printing at firſt confined to claſs purpoſes ſlowly felt its way, until at length it woke up the dormant maſter minds of antiquity, and we come upon a race of men, worthily dignified with the title of "learned printers." It is ſingular that three great families, I had almoſt ſaid dynaſties, of printers, each in its own country, ſtand forward as the greateſt in this age, perhaps in any—the Aldi in Italy, the Stephenſes in France, and the Elzevirs of Holland.

Aldus the elder, founded his printing-office in 1489, and having obtained help, commenced at Venice. His firſt publication was Greek, and it was rapidly ſucceeded by other claſſics. He was a ſcholar, and on this he determined to build his greatneſs. Aldus was not indeed the firſt printer of Greek, but was the firſt who printed Greek with beauty and accuracy. He was the firſt to reduce the ſize of books; and to him and to Petrarch we owe the invention of the beautiful form of type known as *italic*, which being in imitation of writing muſt have been a moſt important ſtep, ſince it doubtleſs made the books to be more commonly underſtood by thoſe uſed only to the old manuſcripts. The reduction in ſize, beſides the gain in convenience, cauſed a reduction in price, and almoſt a like ſtep in advance, to what printing was to manuſcript. The revolution was great, and irreſiſtibly calls to mind the change which has taken place in our own days in the price of books. Yet the beauty of the typography and work, as of the ink and paper, leſs excites our wonder than the correctneſs of his ſcholarſhip commands our admiration. In this reſpect his care was remarkable. He

aſſembled round him learned men for the purpoſe of enſuring ſucceſs to his efforts, and maintaining the activity of his preſſes. They met together on ſtated days, conſtituting, as he called it, an academy, to ſuggeſt works to be printed, to aſſiſt each other's reſearches, or unite their learning to ſolve difficulties. Aldus alſo actively communicated with others of the learned. His ſon Paul ſucceeded him, and at his death, relinquiſhed theſe labours to Aldus the younger, who continued them almoſt to the beginning of the 17th century.

There were ten of the family of Stephens, of Paris, in the 16th century; and an equally large family of the Elzevirs, of Amſterdam, ſpreading over the 17th century—all devoted to the art of printing: of the Stephenſes, Robert and Henry are the luminaries. To the one we are indebted for the Theſaurus of the Latin, to the other, that of the Greek language. Of the Elzevirs, Abraham and Bonaventure were the moſt celebrated—their editions of the claſſics were maſterpieces of printing; and the elegance of their ſmall types exceeded even the impreſſions of the Stephenſes. Theſe are well-known names: but one is little known, yet pre-eminent—Amerbach of Baſle, who printed from 1481 to 1515. To him—to his ſcholarſhip, his zeal, and devoted wealth—the world was indebted for the works of the Fathers, and for this ſervice to learning and religion, he ſtands enſhrined in the praiſes of Eraſmus. With reſpect to Amerbach's labours, the great ſuperiority of the printer to the copyiſt, is for a certain reaſon ſtill plain. The copyiſt of an ancient manuſcript, ſay of the Fathers, might have reaſons for falſifying his original; while ſuch a charge could never fall upon the printer. Theſe printers, like their predeceſſors, were artiſts.

Thus it will be ſeen that the period from 1489, when firſt Aldus Manutius began to print, to 1680, about which time the labours of both the Stephenſes and Elzevirs cloſed, or for 200 years after its mature eſtabliſhment, the hiſtory of printing is nobly illuſtrated, and goes with ſingular unity hand-in-hand with the hiſtory of learning. And thus much was neceſſary for the conſideration of that era of printing which conferred upon the world the poſſeſſion of the claſſics. It is remarkable again in the hiſtory of printing that three great names appear, of a different character indeed, but moſt worthy of note, as being exemplars of the higheſt claſs of typographers.

Nor has our own country been deficient in the poſſeſſion of printer-worthies.

The name of Caxton is a houſehold word with us; and deſerves a ſeparate and ſpecial notice. The names of Baſkerville and Bowyer are ſtill familiar. The one famed for beauty of type; the other for a ſcholarſhip, which obtained for him the title of "the laſt of the learned printers." It is no longer neceſſary for a printer to be learned: it once was. Engaged in dealing with high ſcholarſhip, and printing from love of ſuch, he could not have given to the light of day thoſe mighty works of antiquity, unleſs he had felt their beauties, and dipped deeply at their ſpring. But now, that all is done, there are no more ſuch labours to be accompliſhed. We are no longer "learned" but we are laborious printers. We not only can, but have, performed practical feats, that thoſe worthies, even if they were all combined together, could never have executed. The Fouliſes, Whittinghams, Spottiſwoodes, Hanſards, Clowes', are not unknown to typographic fame. We no longer, like Amerbach, bequeath fortunes for the production of mighty folios, but we provide for you the poſſeſſion of the beſt works in ſcience and literature. Many can remember when the introduction of machinery excited the outcry of the deſtruction of labour; but this produced the bleſſing of the diviſion of labour, which reſulted in the invention of the machinery which conſtitutes the glory of our era. Where one man did everything, although he might have done it well, he could not execute it rapidly; while now the ruſh of thought itſelf (in this pre-eminently rapid age) can hardly exceed the velocity of the preſs. As an inſtance of this, I ſhall juſt mention two great public requirements; the 'London Directory' and the 'Exhibition Catalogue.' The labour, exerciſed upon the former, muſt be apparent; but, time having been taken at firſt for the domeſtic details, and the main maſs of matter remaining; reviſion and correction alone, is neceſſary for the future. The 'Catalogue' is an iſolated inſtance of the power of the preſs: from Polyneſia to Peru; from Judæa to Japan, that 'Catalogue' had to be compiled; from January to July, a period of little more than five months, was occupied in collating, comparing, and correcting a heterogeneous maſs: leſs than four months was ſufficient for the operations of the printer, and on the morning of the 1ſt of May, 10,000 bound catalogues were delivered.

Caxton, the mercer and political agent, was the firſt Engliſh printer; and in

ſumming up the names of thoſe great and learned men who in other countries firſt perfected and carried nobly forward this moſt uſeful of all arts, it is with pride that we find England has a ſhare in their glory. Caxton embraced a new vocation with an earneſtneſs which leads us to believe that he recogniſed the ſtupendous impulſe which he was ſetting in motion for the benefit of his country. Amongſt thoſe who firſt carried printing into the various countries, by compariſon, he bears a high rank, and it is worthy of note that while almoſt all countries except Germany received the art from the hand of foreigners, England pays her debt of gratitude for it to an Engliſhman. Caxton's firſt books were printed on the Continent, but in 1474 he opened a printing-office in the Almonry of Weſtminſter Abbey. And here may be obſerved the extraordinary fact, that monaſteries afforded the firſt ſanctuary to that preſs, which was mainly the cauſe of the deſtruction of the ſyſtem. Selfiſhneſs would have retained this inſtrument in its own ſervice; and the moment it became popular, there were ſtringent efforts to repreſs it. It was the language of Wolſey, "Either we muſt put down printing, or printing will put down us." The claſs of types Caxton uſed were the ancient ſemi-gothic, or black-letter. His connection with Weſtminſter is ſtill practically recorded: in the common phraſeology of printing-offices, meetings of compoſitors are ſtyled *chapels*, and the preſident is called *father*; nor, perhaps, is it too bold to ſay, that the term *juſtification* of type as applied in a printing-office, was derived from a language that might have been learned in the Abbey.

It muſt be obſerved, that the ſame evil conſequences which aroſe in France from the connection of printing with the famous College of the Sorbonne, occurred alſo in England from royal patronage. Statutes appear in the time of Henry VIII., Edward VI., Mary, and Elizabeth, granting ſpecial privilege to particular parties: the reaſon being, "that printing was moſt dangerous and pernicious, if not ſtraitened and reſtrained by politic order of prince or magiſtrate." At this time came, to give at once a power to printing, and an impetus to thought, the fierce controverſy of the Reformation. But in the names of Wolf and Ward in the time of Elizabeth there were bold ſpirits. They affirmed, that they would print any book, "notwithſtanding any command of the queen." The Court and City appear to have been at variance; for Wolf triumphed, and was made printer to the Honourable City of London. And this may

be conſidered as a land-mark, between what might be termed private and popular printing, ſuch as we now have the privilege to poſſeſs it. If all men were ſons of Anak, or all men were dwarfs; if all men were philoſophers or fools; the diſaſtrous reſults to the human race would be the ſame. There can no more be a common meaſure of the mind, than there can be a common ſtandard of the body. It is the diverſity that diffuſes life. The majeſty of man depends upon the freedom of man's thoughts, and the freedom of his thoughts depends upon what Milton termed, "the liberty of unlicenſed printing."

Here let me pauſe once, on the radiance of the paſt, before I introduce you to the ſplendours of the future. The old printing having done its work, there was ſtill a ſpecial miſſion for the new. The moment that modern mind began to ſoar, and thought became free, books of all kinds, and characters, and claſſes, aſſumed ſtill changing phaſes of exiſtence. Every ſphere of human ſcience; every grade of human art; every movement of human civiliſation, looked to printing for its freſh and full development; and hence aroſe the more practical condition of the preſent race of printers. All this the reſult of Gutenberg's idea, foſtered by Fauſt, and perfected by Schoeffer.

I would now introduce you to other three printers, not ſo much for the purpoſe of multiplying examples, as to ſhow that printing has always been regarded as an art, and has moved, as it were, always as an acceſſory of learning, until it reached the preſent deſtiny of its practical power: theſe three are, Aldrovandus, the naturaliſt, of Bologna, 1599; the Duc du Maine, at Trevoux, in 1704; and Horace Walpole. Theſe men were not printers by profeſſion, but we ſhall ſee what they did by printing —and what they accompliſhed for printing.

Aldrovandus is the firſt in time and thought; and I ſelect him, becauſe he is a grand example of the union of illuſtration and letter-preſs—every page of his vaſt double-columned folio work has exact repreſentations of the ſubjects on which he treats. His work is a teſt, and text-book, of everything true or fabulous in nature; and while much is to be rejected by the credulity of the times, and the impoſitions practiſed on himſelf, it is ſtill a valuable repertory of facts. But it is not a criticiſm of the work, but the character of the man, that I would inſiſt on in connection with printing. He

engaged travelling agents for the collection of his materials; employed the firſt artiſts in original drawings; had in his ſervice the moſt eminent engravers; and thus, in fact, intimately connecting himſelf with the art of printing, while in ſcience he may be ſtyled the Ariſtotle of Italy.

The Duc du Maine transferred his ſovereignty and his parliament to the little town of Trevoux, from which emanated the celebrated Dictionnaire de Trevoux, printed at his own preſſes; the hiſtory of the work is curious, for though no longer his, it has always preſerved the name. At firſt a plagiary of the Jeſuits, it became on republication a favourite receptacle for the contributions of men of letters; and theſe were furniſhed in independent articles. This moſt valuable Cyclopædia of ancient and modern learning, antiquarian and philological, gemmed with curioſities of literary intereſt, owes its exiſtence to the noble exertions of the princely printer of Trevoux.

The name of Horace Walpole is familiar to you all, and brings us down to the days of our fathers. A man of rank, a ſcholar, and a gentleman, he ſolaced the ſolitary hours of an afflicted life with the pleaſures of the preſs. An author and an artiſt, he ambitioned to become printer. The Odes of his intimate friend, our great poet Gray, were among the productions of his new profeſſion; and ſquabbles with his compoſitor, and the correction of proofs, alternated the chequered exiſtence of the cynic philoſopher of Strawberry Hill.

This printing, once ſo ſimple, ſo inartificial, and yet the very ideal of high art, has now become ſo extended and ramified, that it becomes capable even of ſectional diviſion, like a ſcience; and by the term ſection, I mean the different operations by which different reſults are produced: theſe are three, prime, yet reſolving themſelves into others; the convex or ſurface, concave or intaglio, and ſtone or chemical printing. This diviſion is more familiar to you by the terms letter-preſs, copper-plate, and lithography; and ſuch an arrangement, though it may appear arbitrary, is yet conſiſtent and exact.

1st. Letter-preſs: types and machinery are its agencies; while this lies as the very germ of knowledge and literature, the others are but acceſſories for ornament and

illuſtration. In fact, this it is which is the agent, in its ſeveral departments, of the riſe, the progreſs, and the completion of a book. Now this remains ſimple as at firſt, but ſolid as at firſt; the inchoate idea ſtarted into exiſtence an accompliſhed fact. All other modes of printing have experienced changes, and undergone improvements, but this, the oldeſt, has remained invariably the ſame. Yet I am ſure you will regard it with the greateſt intereſt of all when I explain and illuſtrate to you its powers, operations, and details.

2ndly. Intaglio or concave printing, the reverſe of letter-preſs, the characters being ſunk inſtead of raiſed, is well-known as copper-plate printing. The jewellery of the Hebrews, the niello of the armourer, the devices of sepulchral braſſes—an art dating from fabulous times of Etruſcan civiliſation, and even Indian mythology—ſtarted firſt into exiſtence as an acceſſory to printing, at the hands of Finiguerra, the Florentine. Artiſts of the higheſt eminence owe much to the effects which reſult from the *line* engraving—from the etching—the mezzotint—and the aquatint proceſſes—as by them, ſingly and collectively, their maſter-pieces have been reproduced and diſſeminated: and whether in their days or in our own, it has occupied a foremoſt place among the arts. This, in fact, requires as much genius as that of the painter himſelf, while in many inſtances the reſults are ſtill more wonderful than thoſe of the original. Its applications are uſeful and ornamental: but the uſe and the ornament are of local and limited application. It is the mode for repreſenting high effects, in writing and ſcript characters, as alſo artiſtic conceptions in pictorial illuſtrations, emblems, and vignettes—with a delicacy of touch impoſſible to obtain from letter-preſs or wood-engraving. Its ſuperiority for ſuch characters is obſervable to the moſt inexperienced eye by comparing it with maps produced by letter-preſs.

3rdly. Chemical printing, of more recent origin than letter-preſs or copper-plate. Chemiſtry, that ſcience, which, though always changing, is always true: and which in the growth of new diſcoveries, cannot deſtroy previous facts, although it may overthrow the dreams of theory, is the agent here. Chemical printing may again be ſubdivided into lithography, zincography, and the anaſtatic method. The chemical

principle of affinity and antipathy forms its baſis—letter-preſs being from a raiſed ſurface, copper-plate from an inciſed ſurface, chemical printing is level. The antipathy between oil and water is known, but not the affinity which they mutually poſſeſs for ſtone and zinc. Printing from ſtone, or lithography, is available for the rapid circulation of autographic documents which require immediate diſperſion; this, in fact, was its firſt object and uſe, and was thought to be an efficient, and far more economical ſubſtitute for copper-plate. The zinc proceſs is identically the ſame, ſave that metal ſurfaces, not being capable of receiving every colour without impairing their luſtre, are leſs capable of chromatic application. The uſe of the anaſtatic proceſs is, rapidly and inexpenſively, to produce facſimiles of ancient print, with a reſult ſatisfactory enough to ſuperſede the tedious and expenſive operation of tranſcribing, by tracing, which was formerly practiſed.

4thly. Photography, in which the ſun is agent. In nature, the mightieſt of painters—all artiſts from all time have taken him for their ſtudy. Let but a cloud come over earth, and what is nature? Let but the pencil of *his* rays touch the firmament, and every rocky height, every leafy nook—every ripple and every foam of the eternity of ocean—every oldeſt form of ancient mind—every architrave of middle age, even to the very ſpeck of time-honoured duſt, and the time-honoured ruin, is produced and pourtrayed. But the ſun himſelf may be ſaid to turn printer, as far as multiplication of copies is concerned, but only by a conſtant uſe of his own power, and, ſtrange to ſay, with the ſucceſſive fading of his efforts. Photography has many practical uſes, but none of ſuch value in expediting work and in economiſing expenſe—as its application to the accurate reduction of Government ſurveys, for the purpoſes of the engraver; which by the old proceſs required to be reduced by hand-work. It is, however, to the extraordinary power of the ſixth ſection, that we are indebted for its perfection; for, by it, an intaglio printing-plate can be produced from a photograph, and copies multiplied, as in letter-preſs or copper-plate.

5thly. Siderography. Steel-printing. Not printing from a ſteel plate; but printing ſteel upon ſteel, ſo that new plates are produced. This is effected by alternate

hardening and ſoftening of the plates. Of difficult operation, of reſtricted practice, it is chiefly applicable to work which is familiar to you, as exemplified by our poſtage ſtamps, by the more complicated labels, patent and exciſe, which require an unlimited reproduction, and by bank-note engraving. This ſection of printing, although neceſſary to mention, is being ſuperſeded by the agency of the ſixth—the electrotype.

I have choſen to call this a ſection; becauſe, though not ſtrictly a prime mode, like either letter-preſs, copper-plate, or chemical printing, it is ſo far eſſential to new demands upon the power and reſources of the preſs, that without its aid, certain reſults could not have been accompliſhed. Electricity, the ſubtleſt and moſt myſterious eſſence pervading earth or air, and yet practically putting Shakeſpeare's "girdle round the earth"—confers the printing power here. The following examples will ſhow you the intereſting applications of this new ſection:—

The art of Nature-Printing could not have been developed without the printing power of the electrotype.

The Ordnance Maps could never have been prepared with that facility and excellence for which they are ſo remarkable, without the intervention of the electrotype.

The enormous demand by the public for copies of the 'Illuſtrated London News,' at the intereſting and important period of the Crimean War, could not have been ſupplied, but by the reduplication of the cuts, only by the agency of the electrotype.

The higheſt art, and the moſt expenſive labour of the hiſtorical engraver, can be reproduced from the ſteel plate, in all its perfection and all its fidelity, only by the agency of the electrotype.

Nay, more, photography itſelf, although a prime printing agent, owes its multiplying power, through the medium of a fixed plate, to the agency of the electrotype.

Here then we have new and ſpecial evidence of the preſent deſtinies of printing, while it is to the agencies of light and electricity that we ſhall have to look for future improvements; and let it be borne in mind, that the electrotype is more and more

furniſhing the means for printing letter-preſs faſhion—our prime and practical ſection —thoſe differences of effects which ſpecially characteriſe the other ſections.

Let me now introduce you, not into a *Scriptorium*, but into the *Sanctorium* of a modern printing-office; let me lead you through its ſeveral departments; let me explain to you its operations; let me ſhow to you its means; let me go to the very fountain-head of its power; let me unfold to you the meaſureleſs amount of its reſources, and then I ſhall be the better able to make you comprehend its object and its aim; and to enable me to perform this, I muſt treat of the operations of the firſt and moſt important ſection of printing—the letter-preſs.

Now, whether alphabets be the arbitrary ſigns of independent nations, or the remnants of a primal language, or the reſult of a decompoſition of hieroglyphs, they are all ſymbols of thought, as expreſſing abſtractions of things, and accommodate themſelves to the univerſal organs of human ſpeech. From the copiouſneſs of a cultivated language, to the mere mouth-click of the Bosjeſman, there is an awful interval, but it is the interval between intellect ſublimated, and ſenſuality abaſed. It is evident that the firſt idea of the art, was that of preſerving things not thought; and certainly not of circulating either. The things themſelves then became the objects of thought, by the aſſociation of new ſymbols—and then, as thought engendered ideas, by cutting down the ſcaffolding, ſo to ſpeak, the ſymbols were finally transformed into alphabetic characters. Our miſſionaries and ſcholars have copied theſe alphabets, have recoined and reſcued them from inevitable deſtruction, and tranſlated the word-ſigns of ſavages and inſtructed them in our own characters. And theſe achievements for printing, and the achievements of printing in this, elevate printing from crude practice, aye, even a rare philology, into the very regions of philoſophy.

Inſignificant as type (which is the image of a ſound) may appear, extraordinary pains and ſkill, ſcholarſhip and intellect, are neceſſary to produce it. Champollion and Purgſtall have been the inſtructors of the type-founder. The firſt and moſt important operation is the formation of the punch, a ſmall bar of ſteel, on which the letter or character of the type has firſt to be cut in relief. This ſtruck into copper, produces a counterpart, termed a matrix. This, fitted into an inſtrument termed a mould, into

which the melted metal is poured, makes the type. Type—caſt perfect in its face or legible character—afterwards (for its adjuſtment and coheſion when compoſed)—requires to be dreſſed. The caſting of the type is a mechanical proceſs—the cutting of the die is an intellectual operation. This is evident if we look at the ſeparate characters of different countries which have been tranſferred to type, and uſed for the purpoſes of printing; ſtill more ſo, when we conſider its reſults in connection with the difficult and intricate characters of Oriental nations.

The European languages poſſeſs two kinds of characters, one for type, another for writing. This is not the caſe with the characters of ancient, barbarous, and Oriental languages. The chiſel, the ſtylus, and the reed were more uſed than the pen. The productions of the chiſel and the ſtylus were not ſo difficult to reproduce in type form as the writings with the reed and pen. For the production of writing characters, ſuch as the Arabian, Perſian, Sanſcrit, &c., in type form, a knowledge of the mode of writing thoſe characters is required by the type-founder as well as his technical experience. The European languages poſſeſs alphabets of capital and ſmall letters. In the Oriental there are no capitals, but one and the ſame letter is uſed in various forms, according to certain rules. Now the ſlighteſt conſideration will enable you to perceive the difficulty of cutting ſuch characters. The moſt complicated of theſe characters, the Chineſe, amount to 60,000 word-ſigns; theſe it would have been impoſſible to type-found, and if founded ſtill more impoſſible to have worked. The Paris type-founders reſolve the characters into elements, termed keys; and then complete the word-ſign by the addition of certain ſtrokes. Theſe keys, amounting to two hundred and fourteen, become an alphabet of the language. The Vienneſe plan conſiſts of decompoſing the Chineſe character into its parts. In the one there is a baſis, around which the other parts are accumulated—in the other, though, perhaps, not ſo ſcholar-like, but exhibiting more the wonderful powers of type-founding, the word is compoſed by means of every ſeparate part. This is plain, that if at any time, a ſyſtem of logography, or ſhort-hand, ſhould become the principle of our written language, the type-founders would have to purſue a ſimilar courſe: taking the nucleus of the character, and making additions: or reſolving it altogether, and thereby enabling the printer to conſtruct ſtill different characters.

Operations like theſe could hardly be expected to emanate from private enterpriſe; they are the peculiar characteriſtic of National eſtabliſhments. The earlieſt eſtabliſhment partaking of a national character was that of the Propaganda at Rome. This printing-office was founded under the auſpices of the Popes, for the purpoſe of ſpreading the Catholic Faith. The number of its Oriental types amounts to twenty-three founts of different languages. This, though a ſmall number in compariſon with the achievements of Imperial Houſes, muſt have been the reſult of great induſtry and ſkill in its time—when we conſider that for two centuries its ſtate has been one of decadence. The true College of the Propaganda has been transferred to England. The Serampore miſſion is rich in type of every diſtrict of India—that vaſt and now doubly intereſting country. Rome inactive, the Britiſh and Foreign Bible Society iſſues its millions of volumes in the year.

The Imperial preſſes of Paris and Vienna—rival eſtabliſhments—poſſeſs in this branch a rich collection of treaſures in typography, beyond even the ſphere of an Oriental collection. The National printing-office of France was founded as far back as the time of Louis XIII., under the auſpices of Cardinal Richelieu; but this eſtabliſhment, like that of the Propaganda, underwent its period of decline. During the empire of Napoleon I., who, it is ſaid, cauſed the type of the Roman office to be removed to Paris, it again flouriſhed. Under Louis Philippe, the collections of Oriental type were conſiderably increaſed. In general printing, the 'Imitation of Chriſt' is the moſt ſplendid production of its typography; its ornamentation is magnificent; and yet ſo difficult is it to execute a perfect work, that its errors, namely, the non-accordance of the date of the character of the type with the ſtyle of the illuſtration, are anachroniſtic. In ſpeaking of books, as the productions of Imperial houſes, I cannot omit the magnificent Bible, known as the King of Pruſſia's Bible; this, though not the achievement of an Imperial, is yet, of a Royal printing-office, and for ſplendour of typography and elegance of illuſtration, may ſafely vie with them. At the preſent time, the ſtrength of this Imperial office amounts to fifty languages of the Eaſt. Rich and beautiful as this collection is, it muſt yield the palm to its rival at Vienna.

The foundation of the eſtabliſhment of Vienna dates from the preſent century.

While the other printing-offices aſpired from the firſt to the higher objects of printing, this office at its origin was confined to the printing of ſtate documents. It continued this ſpecial buſineſs—and perhaps in conſequence of this very reſtriction—it lapſed into decay. Under a new direction it has more than flouriſhed, and attained a wonderful efficiency. It is not merely a great, a National printing-office; it is for ever doing and deviſing ſome novelty and ſome wonder in every branch of ſcientific printing. Its organiſation is perfect. The workmen in every department are ſpecially educated from their youth. It is for ever endeavouring to achieve, and therefore has achieved; while a body of learned profeſſors are attached, to ſuggeſt ſubjects for practice, and practice produces that which might otherwiſe have been nothing but a beautiful theory. No ſpecial production of this office need be adduced for its fame. It is, in fact, in all its departments, a laboratory and academy of the art. If in the early ſtages of printing, conſiderable care and ſkill muſt have been applied to eſtabliſh an alphabet, ſtill rarer care and ſkill was requiſite to unravel back thoſe ancient alphabets, for hundreds of years, in all their variations of character, their multiplicities of manuſcripts, their abbreviations and their modifications, in order ſolely to define typographically one common ſcheme for all. Suppoſe, that printing were ſuddenly to periſh, and that, in the courſe of four or five hundred years, it were rediſcovered; ſome ſuch proceſs as this would be neceſſary, philoſophically to re-adjuſt a printed from a written language. This is merely one of the many reſearches purſued at this truly Imperial office. The thouſands of its foreign alphabets, with all the materials for their conſtruction, is one fact, ſufficient to announce the typographical glory of this eſtabliſhment.

Imperial houſes poſſeſs imperial advantages, and there are public and world-wide benefits for which they are peculiarly adapted. A government, with its colonies and conqueſts, can accumulate lingual and typographic treaſures that are beyond the reach of private individuals—it may become an academy to ſtimulate individual exertions—but the moment it trenches, even by its greatneſs, on the exertions of individual enterpriſe, it commits a wrong. The efforts of the mind of its own people are things which even to touch is to oppreſs. Such may ſafely be left to their own reſources, as is beſt evidenced by the accompliſhments of ſuch houſes as Didot, Claye,

Plon, Beſt, of Paris; Mame of Tours; Haaſe of Prague; and Naumann of Frankfort: it may ſafely be ſaid, that that which gives England ſuch an immenſe ſuperiority, in all which conſtitutes the true power of printing—FREEDOM—is the abſence of an Engliſh Imperial Printing Office; while, the extent and character of work executed by Engliſh private houſes, is quite equal, if not ſuperior, to that of the Foreign Imperial houſes.

Types cannot ſpeak to the mind without the intervention of human agency—they cannot arrange themſelves. Men made them, and men muſt combine them: this combination is the occupation of a claſs of men who are therefore called *compoſitors*, as their work conſtitutes the compoſition of the book. They from early training and practice become, by an extraordinary combination of mental and mechanical operations, tranſlators as it were of our modern hieroglyphy. What is the nature of the training of the compoſitor that ultimately enables him mechanically, as it were, to mentally interpret illegible manuſcript, his ſubjects being on every topic—divinity, law, philoſophy, politics, novels, the drama—to undertake even the punctuation, a queſtion at once of reaſon and of rhythm, in which the author himſelf may be deficient or undetermined, is, if you will conſider it—for the compoſitor is not generally an educated man—a perfect problem of mind. In the courſe of his day's work his mind may have to expatiate—from mathematics to humour—from humour to epic—from epic to proſe: this, conſidering that throughout, his intellect muſt be conſiderably ſubdued by the varying details of mechanical operations, and the divided portion of the manuſcript which is ſet him to compoſe—is another view of the mind of the compoſitor in its ingenuity and intuition. His labour muſt move equally, mechanically and mentally; if the mind be too hurried, his manipulation will be marred; if he compoſes faſter than he conceives, the reſult will be equally fatal. Letter by letter theſe types are picked up in a compoſing-ſtick—placed upſide down—letter-face upwards—reading from left to right—word after word juſtified into lines. Lines upon lines again, from compoſing-ſtick transferred to galley—from galley made up into pages—page after page impoſed, chaſed and coigned up into ſheets; and in this form, true leaden books, become the everlaſting multiplying powers of a printed book.

This permutability of types, and facile diſpoſition, permits that which no ancient form of book permitted, an endleſs power of alteration and correction.

But the compoſition of a work is eaſy, compared to its correction. By this I mean, that the whole form of the work may have to be changed—ſo that the appearance of the publiſhed book may be quite different from that originally compoſed. Here ſolid maſſes of type have to be moved, and re-adjuſted—not merely in pages, but in parcels and paragraphs—and great manual care and ſteadineſs of head is required to transfer the matter without deſtruction or confuſion.

The reputation of a Printing Office depends upon the general accuracy of its works: after the taſk of the compoſitor comes that of the Reader—the ſucceſſor of an array of great names of ſcholars who, in former times, were proud to occupy themſelves in this department—neceſſarily ſubſtituted for them by the great changes in the modern diſpoſition of our work. It is requiſite that this department ſhould be formed of a body of men of judgment and knowledge: competent to correct, not only typographical incorrectneſs and grammatical inaccuracy, but even the author himſelf; not reſponſible for the general ſtyle of the author, but ready to point out diſcrepancies of ſtatement, imperfections of ſtyle, repetitions and aſſertions—tireſome and incorrect; and furthermore to preſerve that uniformity required for the preſs, a unity of letter-preſs effect to which a number of compoſitors engaged upon a ſingle work cannot be ſuppoſed to adhere.

The errors of the compoſitor are thoſe of the mind and eye; and the errors of the corrector ariſe from the ſame cauſe, but cannot be attended with the ſame conſequences. The errors of the compoſitor occur by accidentally falſe diſtribution of the type, by haſty compoſition, by the careleſs preparation or illegible character of the author's manuſcript, and by the eye dropping from ſentence to ſentence terminating with the ſame words. The manuſcript being read to the corrector with the intenſe unintelligibility of his boy, an intimate inſtance of the craft and cunning of the corrector—this boy being the father of the future compoſitor, according to Wordſworth's dictum, that "the child is father to the man"—the omiſſions are at once detected; his general information enables him to decypher terms more accurately

than the compoſitor; and his ſedentary ſuperviſion of the page is ſufficient to detect mere typical imperfections. Conſidering that a book is compoſed of ſeveral thouſand ſeparate types, and that the ſlighteſt tranſpoſition of a ſingle character will produce an error, the wonder is, that even all this care ſhould effect a perfect ſpecimen of a finiſhed piece of typography. After all, even if errors occurred more frequently, this hardly interferes with the pleaſure of the reader; for as the types are but idealogues, when the mind is carried away by the ſubject, he pretermits, for the moſt part, many of thoſe errors which haraſs the mind of the printer. Hence alſo the fact, that few authors are able properly to correct their own works. But errors of the preſs are aſſociated with the profound art of firſt-rate ſcholarſhip, exemplified in what are termed "various readings." The poets, ancient and modern, of the Auguſtan and Elizabethan ages, are poſitively indebted to errors of tranſcription or dictation, for the fineſt and moſt eclectic criticiſm. There is one peculiarity of this department, which ſhows the ſuperiority of mind over matter; that, though types might be compoſed by a machine, and machinery has uſurped the preſs, nothing can ſuperſede the neceſſity for the care and ſkill of the corrector.

In reviewing printing in its intellectual aſpect, it is evident that the invention of the mode for making types—to be combined and recombined—required a greater amount of ingenuity than that of the mere mode of taking impreſſions. But the operations of the preſſman cannot be ignored, though it is to the improvements of machinery that we muſt now attach importance. The qualifications of the preſſman muſt be ſuch as to enable him to enter into what may be termed the picture view of a book; whether the word *picture* be applied to woodcuts or to letter-preſs. In the latter, picture view means the uniformly printed appearance of the work, requiring the exerciſe of conſiderable judgment and ſkill. In the former, this ſkill and judgment amounts even to a queſtion of artiſtic taſte to produce from engraved blocks the intention of the artiſt. And this I ſhall have occaſion to inſiſt upon, ſubſequently, when I compare the progreſs and practice of the modern ſyſtem of book-illuſtration, as contraſted with that of the old workman. The ancient hand-preſs was nothing but a preſs, and yet produced fine work; the improved hand-preſs—a piece of mechaniſm

—was the reſult of our Earl Stanhope's devotion to printing, to whom we are alſo indebted for the ſtereotype. Good printing is commonly conſidered to be the reſult of good manipulation—but more than good manipulation is required; the quality and condition of the paper muſt be taken into conſideration as affecting the beauty of the work; and not leaſt, the condition of the ink. The variations of weather alſo affect the preſſman in his work, owing to the peculiar nature of the compoſition of which his inking rollers are made; ſo that you will ſee that *good* printing depends much upon good materials, and not *altogether* upon the good workman. There are different ſtyles and qualities of work in engraving—which, eſpecially if the wood be of inferior quality or badly ſeaſoned, haraſs the preſſman, when the intention of high claſs art characteriſes the work. Yet ſtill, though machinery is virtually ſuperſeding the ancient preſſman, there are works of ornamental typography which can only be executed by his hand.

Splendid, but barbarous, was the illuminated literature of old; yet, up to the preſent day, in ſtrict accordance with the maxim of Horace, that things leſs ſtrike the mind, which enter by the ear, than thoſe that are ſubmitted to the eye—it has ſerved its end, whether for adornment or illuſtration: the old ſerved more for adornment than illuſtration. The illuſtrated literature of to-day faithfully repreſents, both the requirements, the genius, and the progreſs of the nations. From the days of Albert Durer to thoſe of Bewick and Landſeer, the letter-preſs and the block-book ſeem to have gone hand-in-hand together as inſtructors; and if the ancient artiſts willingly lent their aid to the engravers, ſo alſo have Stothard and Turner enſhrined the genius of our poets by giving a viſible ſcene to their mental conceptions. If loſt views, and vaniſhing forms of life, be embalmed for us in their productions, ſo we alſo preſerve for our ſucceſſors the preſent, which ſhall yet be loſt. Wood-engraving, indeed, though not capable of ſuch high effects as copper-plate, from its comparative cheapneſs and its ſuſceptibility of the touches of a very high art, muſt always take a prominent place in illuſtrated literature. It is impoſſible not to aſſign the palm to our preſent ſtate of the art, as compared with the paſt, conſidered as the delineator of the ſcenery of foreign climes and diſtant countries, illuminating as it were, a work of travel; in the conſideration of this, it is evident that we riſe ſuperior not only to the mere mechanical contrivances of the early printers,

their borders, their monograms, their monſters, but that we come in connection with a body of printing artiſts. In the preſent day, it has attained the higheſt degree of perfection—if perfection of finiſh be the higheſt degree—and this has probably tended in ſome meaſure to the detriment of the art, as art: modern woodcuts often wanting in the rough, ancient vigour what they certainly have gained in delicacy—a ſoftneſs and brilliancy due, in great meaſure, to the perfect manipulation of the preſſman. It is not now, however, chromatic ſplendour only that is required, to catch the eye, and to relieve the dingy ſurface of the ink. The book is a thing for common uſe, and not palatial ornament. Pictures come in here properly and ſimply as a ſupplement to knowledge. Natural hiſtory; ſcenery, foreign or at home; architecture; phaſes of human life and character; theſe are the requirements of the modern illuſtrated book, and theſe are uſed and added in theſe days, in a ſtyle, and with a profuſeneſs, unattainable of old.

And yet, even where chromatic ſplendour is required, from the ſimple principle and proceſs of Senefelder, has ariſen the high art of lithography, which has almoſt put even the old illuminators in the ſhade. Beautiful ſtudies in chalk—gorgeous landſcapes—botanical ſpecimens—illuſtrations for books—transfers from copper, ſteel, and wood—imitations of middle-age miſſals and black-letter—reproductions of Oriental manuſcripts and Chineſe drawings:—theſe are ſome of the wonders of chemical printing. But few could at firſt have expected the new and ſtartling effects which have been recently exhibited in what may be termed its chromo-pictorial powers. Take a painting, whether in oil or water colours, and the nature and powers of that printing proceſs which can reproduce it, muſt be matter of aſtoniſhment: as books by the firſt ſection of printing, as hiſtorical engraving by the ſecond, ſo by the third can the painter's art be multiplied, and thus not merely adorn the palace of the noble, but enlighten the cottage of the poor.

Literature having now obtained univerſal circulation, and knowledge having ſpread, the ſtereotype, to which I have already alluded, obviated here a great difficulty. The demand for literature had ſo materially increaſed, that to print off large editions on ſpeculation of immediate or eventual ſale, or to keep whole works ſtanding in type for

indefinite periods to meet demands for reprints, was equally hazardous: in one caſe there was an uncalled-for outlay of capital inveſted in paper and print; in the other, there was an unneceſſary accumulation of works ſtanding in type, and the conſequent loſs of the repeated uſe of theſe types—a principle quite in oppoſition to the true ſpirit of the firſt invention of moveable types. One curious mode, regarding the object in view—the *releaſe* of the types—conſiſted in welding the under-ſurface of pages of type together into a ſolid maſs; this certainly effected ſtereotype, in its true meaning—fixed type; but it did not effect the moſt important and deſired object—*its releaſe*. Succeſſive experiments led eventually to the proceſs practiſed under the ſuperviſion of the late Earl Stanhope; and this—the method of ſtereotype ſtill in uſe—conſiſts in making plaſter-of-Paris moulds of pages of types, and caſting plates in type-metal: theſe plates are fac-ſimiles of the original pages, and are available for either mode of printing—hand-preſs or machinery—by which type is printed. Here, then, the whole idea of the ſtereotype printing is fully developed: the original type *is* releaſed; and the ſtereo-plates are available indefinitely. Thus the power of multiplying a popular work; of preſerving a perfect claſſic; is attained, while economy is conſulted and capital ſet free. Let me give you a faint idea of the power of this phaſe of type. In one London houſe, there are 233,404 plates.—The 'Penny Cyclopædia' alone has 16,057 plates; the 'Family Herald,' 12,957; 'Houſehold Words,' 10,228: if then, an earthquake buried London, in ſome ſucceeding age, no vain ſtretch of the imagination, theſe leaden books might be diſcovered in the cellars beneath her ſtreets, as ſtrange, but not ſo obſcure, as the books of the Sibyl, and again live and exemplify a forgotten literature.

But if theſe be the powers of printing for thoſe that ſee, there is a deeper power of printing for thoſe that cannot ſee—for the blind! Typology here ceaſes to be philoſophical, and becomes oracular; and unſeen hieroglyphics murmur a ſoul-language. God, when he denies the poſſeſſion of one ſenſe, doubles the ſenſibility of another. Thought thrills beneath the impreſſion of a touch, and ſightleſs eyeballs look into eternal light. But even here, this wonderful and new power of the preſs betrays the imperfection of all human actions, as in the production of theſe books we are obliged either to diſſect an author piecemeal, or to revert to the ponderoſity of the ancient tomes.

I now come to that which has not inaptly been deſignated the *deſtiny* of printing, though, from the moment of the introduction of the fuſile and moveable type printing might be ſaid to have ſeen the *day*. Yet, even then, and ſubſequently, its office was reſtricted—its object was more that of producing and fixing a literature, than diſſeminating it. It was ſtill for the choſen few, and not for the people. Now, by the introduction of machinery within the nineteenth century as the agent in printing, its deſtiny has been accompliſhed, and nothing can reſtrain its path or diminiſh its force. It muſt be apparent that the very moment an agent was diſcovered, worked by the influence of ſteam—an agent poſſeſſed of rapidity of motion—controllable power, and the moſt delicate manipulation—it was capable, by a particular and complicated conſtruction of its parts, of being applied to the purpoſes of printing. The power of the hand-preſs was limited in the hands of men; and ſince the improvements effected in it—though lightening labour, increaſing ſpeed, and producing generally better reſults—were found unequal to the increaſed demand for literature, increaſed ſpeed became a deſideratum where increaſed labour could not be ſupplied; and this was found to be eſpecially the caſe to meet the wants of the mightieſt exhibition of the power of the preſs in its application to the production of a Daily Paper.

Let me revert to the hand-preſs, to give you a clearer idea of the operations of machine-printing. Laying the form of types with due preciſion on the preſs—the working of the ink on the ſurface of the types—laying the paper in its exact place on the tympan—pulling down the friſket over the tympan—running them to and fro under the platten—ſlow and laborious ſucceſſion of pulls, once neceſſary to be perfected by three independent movements. Had, then, the old mode of applying the ink to the types, and which obtained from the earlieſt period of printing, been never capable of change, the new power of printing by machinery would have failed as an effective ſubſtitute; but juſt previouſly, and quite independently, a revolution took place, which led to unforeſeen, but important reſults. The roller was invented, for the equal and eaſy diſtribution of the ink, and this roller is abſolutely neceſſary in the working by machinery. This gives you a faint idea of the perfection of that machinery which combines theſe manifold and delicate proceſſes, and which executes them with a celerity a thouſandfold, with greater perfection, and without any confuſion. Of human

agency nothing is required ſave the boy that ſupplies the paper, and the man that inſpects the progreſs and preſerves the uniformity of the work; the diſtribution of the ink—the rolling that ink on the forms—the ſupply of paper—its conveyance by tapes and rollers under the impreſſion cylinder, through the machine, until finally ejected, together with the adjuſtment of the impreſſion—all this is due to the agency and power of machinery. Machinery is conſtructed for two different objects:—ſlow, for fine claſs work—rapid, for the purpoſes of the Preſs. For the former, the type-form is impoſed upon a flat ſurface, which has a reciprocating motion under an impreſſion cylinder. For the latter, the type form is impoſed upon a revolving cylinder (horizontally or vertically placed), againſt which revolve impreſſion cylinders placed round it at equal intervals. Theſe are the principles of the two kinds—and each is capable of ſimple or complex arrangement. There is a limit, however, to the rate at which type-forms muſt travel, becauſe undue ſpeed would be attended with deſtruction to the inking rollers (the prime element of machine-printing)—and as there is a limit to the number of ſheets which a man can ſupply to the machine in a given time, it is clear that the ſpeed muſt be proportionate to the ſupply. As the productive rate of machinery depends not ſo much upon the rapidity with which the type-forms (whether impoſed upon horizontal and vertical cylinders or upon flat ſurfaces) are made to revolve or reciprocate, as upon the number of modes of ſupply, technically termed feeders, it is plain that the greater the number of feeders which can be placed round the former (the vertical or horizontal cylinder, as the caſe may be,) the more powerfully the machine becomes adapted to the rapidity of production; ſince at every revolution of the vertical or horizontal cylinder (upon which the type-form may be impoſed) as many copies will be printed as there are feeders placed round it: thus ſpeed is obtained without undue increaſe in the travelling rate of the type-forms. This will be apparent to you on inſpection of the Diagrams. The moſt ſtriking example of organiſation of machinery known is that of the 'Times.' But at length, machinery, in connection with journaliſm, would be next to uſeleſs without the aid of the ſtereotype; for its very rapidity would have defeated its object.

The machinery of the 'Times' conſiſts of one vertical machine of nine feeders, two vertical machines of eight feeders, three horizontal machines of four feeders, with four

engines of twelve-horſe power; the nine-feeder machine prints at the rate of 13,500 per hour; the two eight-feeders, each, print at the rate of 12,000 per hour; the four-feeder machine, at the rate of 5000 per hour. On occaſions when the 'Times' conſiſts of two ſheets of eight pages, the ſyſtem purſued is as follows: Between the hours of ſix and one, from the previous evening, the firſt (the advertiſement) ſheet, is printed from the two eight-feeder machines. About two in the morning the firſt form, of the ſecond ſheet, or newſpaper, commences printing on the nine-feeder machine; the ſecond form, delayed two or three hours for the lateſt account of Parliamentary proceedings, is ſtereotyped; a proceſs requiring only ſome twenty minutes: ſo that, by printing this form in duplicate at the two eight-feeder machines, previouſly occupied by the Supplement, the delayed form, in conſequence of this duplication, catches the firſt, in ſufficient time to allow, which is of the utmoſt importance, the deſpatch of the country editions. At this preſent time, machinery of ſtill greater power is in the courſe of conſtruction for the 'Times.' Could Gutenberg, if he were to riſe from the dead, imagine that at the preſent day, there would be more than 4000 preſſes in Europe, each houſe being deſignated by its preſs; and of theſe, 600 in the City of London alone,—and 1000 printing-machines in England, ſupplying the printing requirements, on ſuch a ſcale as this, for her populations! Have I not rightly termed this, the material—I ſhall yet have to conſider the moral—deſtiny of printing?

Now, as it is the Preſs which chiefly required rapidity in its various departments, it is to the Preſs that we are indebted for the firſt ideas of any mode of facilitating compoſition;—and as it is to the Preſs, that, if type-machinery be ſerviceable at all, it is moſt eſpecially applicable, I ſhall here explain the purpoſes and difficulties of this peculiar machinery. The firſt endeavour to facilitate compoſition, was the curious method known as logotype—and this conſiſted of caſting entire the main or leading words of ſentences. This would at firſt appear a great ſaving of time and labour; but you perceive that an injury to one character of the word deſtroyed the word itſelf, and thus rendered the idea altogether nugatory. It moreover complicated the ſyſtem of the compoſitors' caſes. In later days, attention has been directed to the conſtruction of machinery for compoſing and diſtributing type. Without altogether negativing the poſſibility of a ſucceſsful application of mechaniſm to perform that which, we have

before deſcribed, muſt be a *purely* mental occupation, I will ſtate what has to be overcome to arrive at a perfectly practical reſult. The queſtion is not, Can a machine be conſtructed to compoſe and diſtribute type ? That is already an eſtabliſhed fact. It is, Can a machine be ſo conſtructed as not only to compoſe type, but alſo to juſtify it into lines ? If not, then hand-compoſition muſt remain immeaſurably ſuperior in rapidity and economy ; becauſe the loſs of time reſulting from the double operation of one party employed upon the action of the machine, and another employed in juſtifying or regulating the compoſed types into lines, is not counteracted by any increaſed ſpeed in the compoſition : the moſt wonderfully perfect machine will not enable a man to read and underſtand—in fact to do the combined operations of the compoſitor. If this be the caſe with the operations of the Preſs, how much ſtronger muſt be the objection, in the varied operations of book-work—ſo fine, ſo ingenious, ſo complicated, ſo mental, as detailed to you in the deſcription of the compoſitor ?

As literature led to printing—ſo printing alſo led to literature. Created thus at firſt, it afterwards controlled it. By literature you will underſtand that I mean, not the ſpecial departments of ſcience, but that inner love of the beautiful which has always been the exponent of the human mind. From the poetry of Chaucer to that of Tennyſon, from the romances of Scuderi to thoſe of Scott, there is a vaſt interval, not ſo much of time, as of the modes of thought ; but even here perhaps, not ſo much the mind of the times, as the material agency may be regarded as an inſtrument in the difference. Taſte, though uneducated, is ſtill true. Paſſion, though ſtrong, may ſtill be pure. Love and hate, the diverſities and contraſts of ſociety, the ſplendour of the rich and the ſqualor of the poor—theſe are things which agitate the bye-lanes and the alleys as much as any boudoir in Belgravia. The days of chivalry, even, are not gone by with them. The novels of Bulwer, and of Dickens, and Thackeray, are not read with half the intenſe intereſt by the lady on her ſofa, as ſome pitiful or exciting tale in the penny literature of the poor. But the novels of Bulwer, and Dickens, and Thackeray, while equally diſplaying character and diſſecting paſſion, are of a higher tone, and rather put man the abſtract before you, than man the individual ; rather elevate by contraſt, than degrade by contact. But how to circulate theſe maſter-pieces among the million, would have

been an unſolved problem, if it were not for the fact, that printing can control literature; that as the means muſt be worked, it can only be ſucceſsfully worked by cheapneſs. The moment the copyrights of valuable works become available, printing has always ſtepped in to prevent them from periſhing or becoming ſcarce. They had ſerved their purpoſe with the few—they now became the property of the many. Our immortal authors, the harbingers of a moral day; our Shakeſpeares and Miltons, our Addiſons and Goldſmiths; have thus reached a multitude of readers, with whom elſe they never could have been familiar. The very block-books of old have become as nothing in compariſon with our penny illuſtrated literature. The whole power of the printing mind has been but to elevate this. I ſpeak not of the movements for great public good, effected by great public bodies, nor of the efforts of religious ſocieties: I ſpeak merely of the individual enterpriſes of private printing. Knight and Chambers have been the foremoſt printing philanthropiſts; and printing competition has even had its influence on the Preſs. This conſtitutes the literature of the great intelligent middle claſs. Even the artiſan and the ſeamſtreſs, their children and their families, muſt have ſomething more than the companionſhip of miſery to excite and guide thought; ſomething to elevate, inſtruct, conſole. Where is this literature, in accordance with their limited means of learning, to be found? In the penny literature, adapted to the very tone of mind, and the erratic but ſtill common taſte of the pooreſt of the poor. Where does the 'Family Herald,' with its circulation of 252,750, move?—among the maſſes. Where does the 'London Journal,' with its circulation of 400,000, move?—among the maſſes. Let us take another claſs of literature—what I may term family literature. Where does the 'Sunday at Home,' with its circulation of 75,000, move?—among the maſſes. Where the 'Leiſure Hour,' with its circulation of 95,000?—among the maſſes. Thought tells—mind moves. If then the mind of the people be elevated to your own, the mind of the people muſt move more equally with your own, and prove to both that there is not merely no natural, but no actual antagoniſm between them. And quiet thoughts and ſoothing influences, engendered by ſuch ameliorating agencies, will do more to lighten the intervals of labour, than the mournful cadence of Hood's "Song of the Shirt."

What, then, man wants to do, he does: and his very actions thus preſent new wants. It is the law of his progreſs. Seal-engraving, rock-ſculpturing, tablet-carving, block-cutting, fuſile types, preſſes, machines, are but the outer ſign of the one and inviſible mind. When the nations ſat in 'groſs darkneſs,' there ſtill was a gleam, but only a gleam, of the primal civiliſation. The thirſt of conqueſt, which firſt cut up, and then coaleſced the peoples, made the labour and the intellect of the gifted among them, ſubſervient to the glory and luxury of their conquerors; then aroſe the mighty monuments of the paſt, which ſerve as hiſtoric landmarks to the preſent. Then arts began, flouriſhed, and faded—faded, but to riſe again; and according to the genius and requirements of the country and the people, took various ſhapes of elegance and taſte, but the pervading principle was the ſame. Then literature, which was but at firſt the trappings of barbaric pride: and then the aſpirations of thought—ſubtle in the Oriental, profound in the Greek, practical in the Roman—poured with its advancing tide of civiliſation upon the regions of the Weſt in new forms and with a new faith—and then rolled back upon the Eaſt, with new ſublimity and ſenſe: but ſtill, amid convulſions of the nations—this ſeething of the ſands of truth—a beacon has ariſen, which, though it cannot prevent ſtorms, can avert cataſtrophes: though it cannot eradicate error, can overcome crime: and that beacon, is Printing and the Preſs. Gathering up all its ſtores from the remoteſt paſt, it accumulates them with reflected light upon the darkneſs of the unknown future. Philoſophy, hiſtory, theology, ſcience, arts, languages, are embalmed, and that which was once the painful record of iſolated facts, has now become the free inheritance of all. It is not the dumb oracles of ſtone—with their reſtricted records, and their local application—though they put a torch into our hands to illumine the dawn of the paſt. It is the winged words of the printed book, which cover with an eternal effulgence the deſtinies of the future. Not things, but thoughts, now control human actions, and regulate the progreſs of human minds. The glories of all languages, deeply indebted as we are to them for profundity and practice—are in the deſtiny of printing but as tongues and dialects, to the glories of the diffuſion of our own. It is not the millions of bibles that ſow Truth broadcaſt over the earth. It is not the billions of books that create and mould knowledge to the requirements and form of every mind. It is not the Giant Preſs, that from the

four winds of Heaven wafts to all quarters of the world the woes and wants, the wickedneſs and worth of man, and unfurls in its hand the never-drooping ſtandard—Liberty! Deals with the high politics of nations, and deſcends to the humbleſt needs of human life! Elevates the being into the Man, and teaches men and men, though divided by oceans, that they are brothers! It is not even this. It is this: the life, the ſpirit, and the principle that pervades it, and renders it immortal! It is this: that Printing has rendered intelligence imperiſhable! This power, neither Sorbonne nor Index Expurgatorius can ſuppreſs. This power, neither Cæſar nor Satan can withſtand. And if ever, in the providence of God, the prophecy of Lord Macaulay ſhould be accompliſhed, that the New Zealander ſhall one day ſit upon the ruins of London Bridge, the civiliſation that ſhall have led that ſoul-enfranchiſed ſavage to ſurvey and to mourn over the mother that had yearned for and ſaved him, will all have emanated—to him and to his countrymen, and to millions like him, who have eſcaped into the 'marvellous light'—from the might and the majeſty, the power and the purity, of England's Printing and of England's Preſs!

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H. B.